

**Spectral analysis in the visible range of light  
transmission through sub-wavelength annular apertures  
arrays in gold films**

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Baida and Van Labeke recently proposed a structure which exhibits a supertransmission of light through metallic films pierced by submicronic apertures. This structure consists of an array of nanometric coaxial apertures in a metallic film and it has been named AAA: Annular Aperture Array [1,2,3].

Our first structure consists of a large array of coaxial apertures with inner and outer diameters of 250nm and 330nm respectively and a grating period of 600nm in 150nm gold film (for the fabrication procees see ref. [4]). It experimentally shows a transmission peak at 700nm around 17% and it fits very well to the theoretical spectral response obtained by FDTD calculation (to be published in *Optics Letters*).

We propose here new structures with an enhanced transmission: the different parameters (period, inner and outer diameter) had to be redesigned and optimized so that these structures exhibit a supertransmission of light of 80% such as in reference [1].

[1] F.I. Baida and D. Van Labeke, *Optics Commun.* 209, 17 (2002).

[2] F.I. Baida and D. Van Labeke, *Phys. Rev. B* 67, 155314 (2003).

[3] D. Van Labeke, F.I. Baida and J.M. Vigoureux, *J. Microscopy*, 213, 140 (2003).

[4] A. Perentes, I. Utke, B. Dwir, M. Leutenegger, T. Lasser, P. Hoffmann, F. Baida, M.-P. Bernal, M. Russey, J. Salvi and D. V. Labeke, *Nanotechnology* (2004).